

Unit 6 Lesson 1 Classwork/Homework

On a separate sheet (or the back), verify each identity. Pay special attention to clear one-step, one-line solving.

1. $\sin x \cdot \cot x = \cos x$

2. $\cos x \cdot \csc x = \cot x$

3. $\sin x \cdot \sec x = \tan x$

4. $\cot \theta + \tan \theta = 1$

5. $\frac{\tan x}{\cot x} = \tan^2 \theta$

6. $\frac{\sin^2 \theta}{\csc \theta} \cdot \frac{1}{\sin \theta} = \frac{\sin \theta}{\csc \theta}$

7. $\frac{\cos \theta}{\sec \theta} = \cos^2 \theta$

8. $\sin x (\cot x + \sec x) = \cos x + \tan x$

9. $\frac{1 + \cot x}{1 + \tan x} = \cot x$

$$1. \sin x \cdot \cot x = \cos x$$

$$= \sin x \cdot \frac{\cos x}{\sin x}$$

$$= \frac{\cancel{\sin x}}{\cancel{\sin x}} \cdot \frac{\cos x}{1}$$

$$= \cos x$$

$$2. \cos x \cdot \csc x = \cot x$$

$$= \cos x \cdot \frac{1}{\sin x}$$

$$= \frac{\cos x}{\sin x}$$

$$= \cot x$$

$$3. \sin x \cdot \sec x = \tan x$$

$$= \sin x \cdot \frac{1}{\cos x}$$

$$= \frac{\sin x}{\cos x}$$

$$= \tan x$$

$$4. \cot x \cdot \tan x = 1$$

$$= \frac{\cos x}{\sin x} \cdot \frac{\sin x}{\cos x}$$

$$= \frac{\cancel{\cos x}}{\cancel{\cos x}} \cdot \frac{\cancel{\sin x}}{\cancel{\sin x}}$$

$$= 1$$

$$5. \frac{\tan x}{\cot x} = \tan^2 x$$

$$\frac{\cancel{\tan x}}{\cancel{\tan x}} = \frac{\sin x}{\cos x} \cdot \frac{\sin x}{\cos x} = \tan x \cdot \tan x = \tan^2 x$$

$$6. \frac{\sin^2 \theta}{\csc \theta} \cdot \frac{1}{\sin \theta} = \frac{\sin \theta}{\csc \theta}$$

$$= \frac{\sin \theta \cdot \cancel{\sin \theta}}{\csc \theta} \cdot \frac{1}{\cancel{\sin \theta}}$$

$$= \frac{\sin \theta}{\csc \theta}$$

$$7. \frac{\cos \theta}{\sec \theta} = \cos^2 \theta$$

$$= \frac{\cos \theta}{\frac{1}{\cos \theta}}$$

$$= \frac{\cos \theta}{1} \cdot \frac{\cos \theta}{1}$$

$$= \cos^2 \theta$$

$$8. \sin x (\cot x + \sec x) = \cos x + \tan x$$

$$= \sin x \left(\frac{\cos x}{\sin x} + \frac{1}{\cos x} \right)$$

$$= \sin x \cdot \frac{\cos x}{\sin x} + \frac{\sin x}{\cos x}$$

$$= \cos x + \tan x$$

$$9. \frac{1 + \cot x}{1 + \tan x} = \cot x$$

$$= \frac{1 + \cot x}{1 + \frac{1}{\cot x}} = \frac{(1 + \cot x) \cdot \cot x}{\left(1 + \frac{1}{\cot x}\right) \cot x}$$

$$= \frac{\cot x (1 + \cancel{\cot x})}{(\cot x + 1)}$$

$$= \cot x$$